भारतीय मानक

Indian Standard

IS 4254 : 2023

हनु दलित्र — सामान्य अपेक्षाएँ

(दूसरा पुनरीक्षण)

Jaw Crushers — General Requirements

(Second Revision)

ICS 91.220

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May 2023 **Price Group 5**

Construction Plant and Machinery Sectional Committee, MED 18

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Construction Plant and Machinery Sectional Committee had been approved by the Mechanical Engineering Division Council.

Jaw crushers are generally used for crushing rock and similar hard material and contain two rectangular surfaces of jaws, one of which alternately approaches and recedes from the other. The jaws contain an angle and together with two side plates, enclose a wedge-shaped cavity which is wider at the upper or feed end. The material which is fed at the upper end gets crushed mainly by compression between the two jaws and discharges through the outlet.

This Indian Standard was first published in 1967 and subsequently revised in 1994. Since then many suggestions were received for improvement as a result amendment 1 was issued and has been incorporated with this revision. This standard is being revised again to keep pace with the latest technological developments and international practices. BIS certification marking clause has been modified to align with the revised *Bureau of Indian Standards Act,* 2016. The principal modifications in this revision are as follows:

a) Clause **2.1.1** and clause **3.1.1** have been modified; and
b) Clause **7** General requirements for jaw crushers has also been modified.

Particulars regarding information to be given to the manufacturer by the purchaser with enquiry or order and the information to be furnished by the manufacturer to the purchaser along with the quotation are given in Annex A and B respectively.

The composition of the committee responsible for the formulation of this standard is listed in Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that to the specified value in this standard.

Indian Standard

JAW CRUSHERS — GENERAL REQUIREMENTS

(Second Revision)

1 SCOPE

This Indian Standard covers the jaw crushers which are commonly used for crushing rocks.

2 TERMINOLOGY

2.1 For the purpose of this standard the various components of the jaw crusher shall be designated as in Fig. 1.

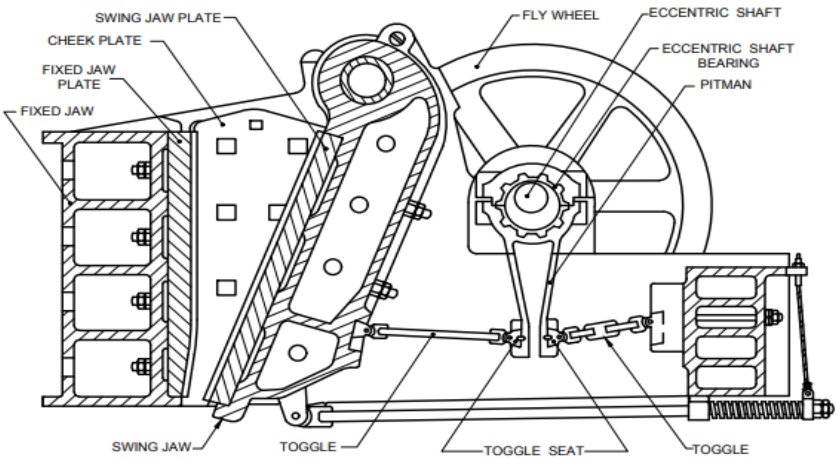

FIG. 1 NOMENCLATURE FOR JAW CRUSHERS

2.1.1 *Jaw Crusher* — Compression crushing machine consisting of a fixed jaw and a movable jaw which moves to increase and decrease the gap between the two jaws.

3 CLASSIFICATION

3.1 For the purpose of this standard jaw crushers shall be classified as follows.

3.1.1 *Depending Upon the Operating Mechanism*

a) Single-toggle jaw crusher

Jaw crusher in which the jaw stock is suspended from an eccentric shaft and is braced by a toggle from the back plate so that each point of the mobile jaw moves through a close curve path (*see* Fig. 2).

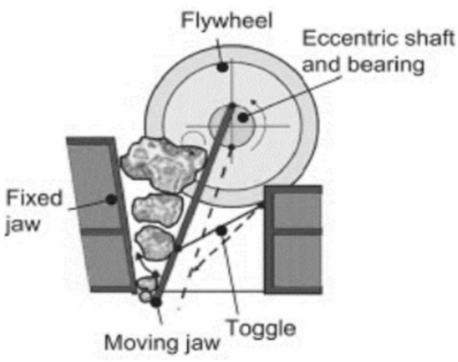

FIG. 2 SINGLE — TOGGLE JAW CRUSHER

b) Double-toggle jaw crusher

Jaw crusher in which the motion of the eccentric shaft is transmitted to the jaw through the pitman and two toggle plates; each point of the mobile jaw moves through a segment of a circular path (*see* Fig. 3).

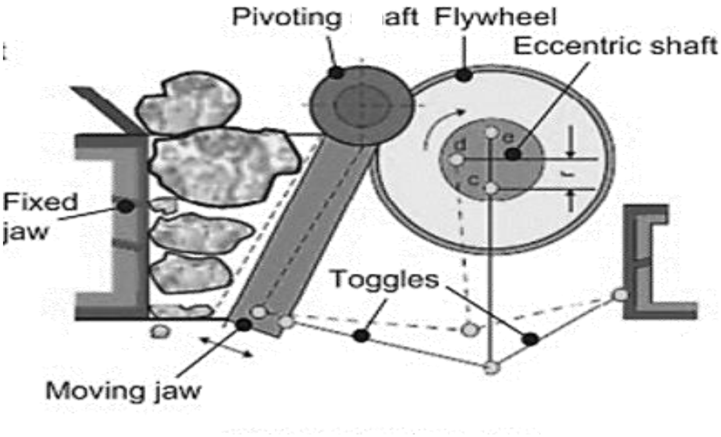

FIG. 3 DOUBLE — TOGGLE JAW CRUSHER

3.1.2 *Depending Upon the Size of the Jaws*

a) Jaw crusher with a normal width, where the ratio l/b is between 1.4 and 1.6, where 1 and b denote respectively the width of the jaw and minimum feed gap respectively; and
b) Jaw crusher with extended width, where the ratio l/b is between 2.2 and 5.7, where 1 and b denote respectively the width of the jaw and minimum feed gap respectively.

4 SIZE

The size of the jaw crusher shall be designated by the jaw width and the charging gap width in millimetres.

5 DESIGNATION

The designation of a jaw crusher shall include:

a) Commonly used name;
b) Jaw width in mm;
c) Minimum feed gap in mm;
d) Minimum gap at the delivery end in mm;
e) Whether single-toggle or double-toggle; and
f) Number of this standard.

Example

A jaw crusher with 400 mm jaw width, 250 mm minimum feed gap, 20 mm minimum gap at the delivery end and of single-toggle type shall be designated as:

Jaw Crusher 400 × 250/20 ST IS 4254

6 SUPPLY

The manufacturer shall supply a certificate to the purchaser along with each machine certifying that the crusher has been inspected for freedom from visible defects and the crusher has satisfactorily withstood the trial run. Items to be covered under this certificate are given in Annex C.

7 GENERAL REQUIREMENTS

7.1 Both jaw plates shall be provided with a rough surface to increase the grip on the crushing material and to minimize the slipping of material. The jaw plates shall be bolted in sections for simple removal or periodic reversal to equalize wear.

7.2 Jaw crushers must be robustly constructed. The main frame is often made from cast iron or steel, connected with tie bolts. Jaw crushers may have the main frame of welded mild steel plate. The jaws are usually constructed from cast steel and fitted with replaceable liners, made from manganese steel, or “Ni-hard,” a Ni-Cr alloyed cast iron. Apart from reducing wear, hard-liners are essential to minimize crushing energy consumption by reducing the deformation of the surface at each contact point.

8 MARKING

Each jaw crusher shall have a suitable metal plate on the body carrying the following data in the legible form:

a) Name of the manufacturer;
b) Serial number and year of manufacture of the machine;
c) Size;
d) Capacity; and
e) Power consumption.

8.1 BIS Certification Marking

The product may also be marked with Standard Mark.

8.1.1 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

ANNEX A

(*Foreword*)

INFORMATION TO BE SUPPLIED BY THE PURCHASER TO THE MANUFACTURER WITH THE ENQUIRY AND ORDER

A-1 The enquiry and order by the purchaser should state:

a) Material;
b) Bulk density, tonnes/m^3;
    1) Type of material (Hygroscopic, soft, brittle, etc.); and
    2) Moisture contents, percent.
c) Structure of material (crystalline, granular, flaky);
d) Crushing strength, if possible, N/m^2;
e) Feed size, mm;
f) Chemical property, corrosion with iron, etc;
g) Product size, mm;
h) Capacity of crusher required, tonnes/hour;
j) Ultimate use of material (permissibility of iron in the product); and
k) Any other remarks.

ANNEX B

(*Foreword*)

INFORMATION TO BE FURNISHED BY THE MANUFACTURER TO THE PURCHASER ALONG WITH THE QUOTATION AND SUPPLY

B-1 The manufacturer shall give the following information along with his quotation and supply :

a) Size and designation (single-toggle/ double-toggle, hinged/fixed jaw, type of grooves on plates);
b) Maximum feed opening, mm;
c) Minimum and maximum opening at the bottom of the jaw, mm;
d) Maximum recommended feed size, mm;
e) Capacity of crusher with respect to the discharge opening, tonnes/h;
f) Energy consumed to crush the material kW/tonne; and
g) Material of construction with regard to the following major components of the jaw crusher:
    1) Frame;
    2) Swing jaw;
    3) Swing jaw shaft;
    4) Pitman;
    5) Pitman shaft;
    6) Pitman shaft bearing;
    7) Jaw plates;
    8) Cheek plates;
    9) Toggle; and
    10) Flywheel.

ANNEX C

(*Clause* 6)

INFORMATION TO BE GIVEN IN THE CERTIFICATE BY THE MANUFACTURER TO THE PURCHASER AT THE TIME OF SUPPLYING THE MACHINE

C-1 INSPECTION

C-1.1 The inspection report shall state that each part of the crusher has been inspected before painting to ensure that it is free from any visible defects in casting, machining, etc.

C-2 TEST-RUN

C-2.1 The test-run report shall state:

a) The number of hours the crusher has been run continuously under no-load after completion of the assembly; and
b) After the trial run inspection has been carried out to ensure that:
    1) The construction of the crusher is satisfactory;
    2) Lubricating condition is satisfactory;
    3) There is no slackness or unusual wear on any component; and
    4) The bearings are evenly loaded.

NOTE — Only the prototype crusher shall be dismantled to carry out an inspection after the trial run to ensure items 1 to 4 above. All others shall be inspected without dismantling.

ANNEX D
(*Foreword*)

COMMITTEE COMPOSITION
Construction Plant and Machinery Sectional Committee, MED 18

Organization	*Representative(s)*
Directorate General of Quality Assurance, Ministry of Defence, New Delhi	Brig P. K. Shrivastava (***Chairperson***)
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Directorate General Border Roads, New Delhi	Col Amit Bhardwaj
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Organization	*Representative(s)*
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Wirtgen India Private Limited, Pune	Shri Deepak Bhoir Shri Parul Arora (*Alternate*)
In Personal Capacity (*Flat no. 3052, Prestige Shantiniketan, Whitefield main road, Bengaluru*)	Shri S. N. Mahajan
In Personal Capacity (*D-24, Amar Colony, New Delhi*)	Shri Satander Kumar
BIS Directorate General	Shri Rajneesh Khosla, Scientist 'F'/Senior Director and Head (Mechanical Engineering) [Representing Director General (*Ex-officio*)]

Member Secretary
Shri Lokraj Meena
Scientist 'B'/Assistant Director
(Mechanical Engineering), BIS

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This Indian Standard has been developed from Doc No.: MED 18 (19105).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi